

CHANGES OF NAMES: *Ricciella crystallina*, *R. fluitans*, *R. membranacea* and *R. Sullivantii* (of the first Revised List) are replaced in the genus *Riccia* (XVII, 74); *Neesiella pilosa* and *N. rupestris* are included in the genus *Grimaldia* (XVII, 75); *Fossombronia salina* is superseded by *F. brasiliensis* (XVII, 75); *Plagiochila Sullivantii* (of list) is now *P. Austini* (XI, 68); *Calypogeia tenuis* is now *C. paludosa* (XII, 119); *Cephalozia serriflora* again becomes *C. catenulata* (XII, 112); *Diplophyllia albicans*, *D. apiculata* and *D. taxifolia* are placed in the genus *Diplophyllum* (XI, 74); *Scapania gracilis* (of list) is included under *S. nemorosa* (XIII, 75); *Porella rivularis* (of list) is included under *P. platyphylla* (XII, 109).

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NOTES ON *TRIOSTEUM PERFOLIATUM* AND RELATED SPECIES.

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FOR many years the *Triosteums* of Central New York have given trouble to botanists. In 1918 the writer described a variety from this region (var. *glaucescens*, RHODORA xx. 116) but this did not entirely solve the difficulty. Two large and thrifty patches of the smooth-leaved type were found nearly 25 miles apart in which some individuals had broadly perfoliate leaves while the leaves of others in the same patch were entirely separate at the base. A careful comparison of various features of the leaves, flowers, and fruits, character by character, showed absolutely no other difference. These perfoliate-leaved plants could scarcely be interpreted as hybrids of *T. perfoliatum* and *T. aurantiacum* as only one other collection of plants with perfoliate leaves has been made in the entire basin of Cayuga Lake. This perplexing situation has led to a study of the whole group at the Gray Herbarium and through several seasons at Ithaca.

In his original paper on *T. aurantiacum* Bicknell¹ gave twenty-five differences between *T. perfoliatum* and *T. aurantiacum*. In this paper *T. perfoliatum* was said to differ from the latter species as follows: (1) the principal leaves strongly perfoliate instead of separate;

¹ Torrey a. i. 25 (1901).

(2) upper leaves sometimes separate instead of sometimes perfoliate; (3) internodes shorter; (4) plant stouter; (5) plant more leafy; (6) leaves more rugose, (7) thicker, (8) paler beneath, (9) more densely soft-pubescent; (10) calyx-segments much shorter, (11) less foliaceous, (12) narrower, (13) more acute; (14) corolla often duller and greenish on lower half instead of dull purplish red, firmer; (15) the tube scarcely dilated or two-lipped instead of decidedly two-lipped and upwardly dilated; (16) the lobes shorter and more erect, (17) and scarcely surpassing the anthers; (18) style more exerted; (19) fruits more numerous (6-8 instead of 2-6) and more crowded, (20) more globose, (21) smaller, (22) dull greenish-orange instead of orange or bright orange-red; (23) an inhabitant of more sandy soil, (24) and of lower more level woods and thickets; (25) flowering about two weeks earlier. To these differences the writer may add as no. (26) a more densely crisp-pubescent stem in *T. perfoliatum*. A comparative study of about 175 herbarium specimens in addition to many in the field has failed to show that these differences are all valid. With the character of perfoliate leaves only nos. 9, 12, 13, 14, 15, 16, 18, 23, and 26 could be even generally correlated. Under most of the other numbers no differences could be found while some numbers were indiscriminately variable. Where the above differences seemed to correlate, the correlation was, however, chiefly in averages and the extremes overlapped very badly, showing tendencies rather than distinct groups. To a certain extent it was found that the same characters were not always combined, thus forming various combinations of characters. Sortings on different characters showed no possibility of making distinct groups, the only groups approaching distinctness being those given in the key below. Perfoliate leaves were found occasionally in the non-perfoliate group; dense crisp pubescence frequently in the group with normally loose villous pubescence; narrow acute sepals where these should be broad and blunt; non-flaring corolla where this should be flaring. A constant difference in length of stamens could not be made out. In the var. *glaucescens* the sepals were narrow or broad. Though originally not doubting that *T. perfoliatum* and *T. aurantiacum* were distinct species, the writer has now come to the belief that there is far too much intergrading to make possible the retention of both as species. It is therefore proposed to treat the North American *Triosteums* as in the following key. Because of the exceptions, the varieties under *T. perfoliatum* are best recognized

by the summation of the characters given and not by any one character. It has not been possible to interpret the numerous names proposed by Rafinesque.¹

- a. Sepals finely and for the most part evenly and densely pubescent; flowers 2-6 at each node; corolla pale- to deep-purple, 8-15 (-17) mm. long, densely and often crisply puberulent, more or less glandular; pubescence of the stem various; leaves narrowly to broadly ovate-oblong, finely strigose or subglabrate above with hairs which when present are 1 mm. long or usually less.
- b. Leaves velvety beneath.
 - c. Cauline hairs 1.5 mm. long or less, the majority very short and glandular.
 - d. Middle leaves usually perfoliate, densely velvety beneath; stem usually crisp-pubescent, often densely so; calyx-segments usually narrow (in flower 0.9-2.0 mm. wide, averaging 1.4 mm.), very acute; corolla pale, firm, the mouth 5-6 (-7) mm. in diam., usually not flaring; style usually exerted as much as 1.5-3.0 mm. *T. perfoliatum*.
 - d. Middle and other leaves usually not perfoliate, generally less velvety; stem usually villous; calyx-segments generally broader (in flower 1.5-2.8 mm. wide, averaging 2.0 mm.), obtuse or acute, generally more purple; corolla generally brighter and more purple, often thinner, the mouth 7-9 mm. in diam., usually more flaring; style rarely exerted. var. *aurantiacum*.
 - c. Cauline hairs 1.5-2.5 mm. long, nearly all of the long type; sepals with some marginal bristles; setae on upper surface of leaves up to 1 mm. long; approaching *T. angustifolium* var. *illinoense*.
 - b. Leaves glabrous or nearly so beneath, not perfoliate; pubescence of calyx and corolla generally as in var. *aurantiacum*; sepals usually acute. var. *glaucescens*.
- a. Sepals hispid-ciliate, otherwise sparingly short-hispid or glabrous; flowers usually 2 at each node; corolla pale, 14-18 mm. long, loosely villous, slightly glandular, the lobes large and broad; stem setose-hispid, the hairs nearly all long (longest hairs 1.5-2.8 mm. long); leaves lanceolate to oblanceolate, distinctly hispid-strigose above with hairs 0.8-1.8 mm. long, not perfoliate.
 - b. Leaves glabrous beneath or strigose on the nerves; lobes of the corolla broad. *T. angustifolium*.
 - b. Leaves velvety beneath; the blade slightly broader and less acuminate; lobes of the corolla oblong; sepals more generally obtuse. var. *Eamesii*.

1. *T. PERFOLIATUM* L. Sp. Pl. 176 (1753). *T. majus* Michx. Fl. Bor.-Am, i. 107 (1803). Rocky woodland and open scrubby places in light soil: Massachusetts to the District of Columbia, in the mountains to North Carolina, and westward from Indiana and Tennessee to Wisconsin, Missouri, Kansas, and Nebraska. This is apparently a plant of the less rich and lighter, scarcely calcareous soils of the eastern slope of the Alleghany Mountains and of the

¹ New Flora of North America ii. 35-37 (1836).

upper Mississippi valley, extending on to Cape Cod in Massachusetts. It is structurally more constant than var. *aurantiacum*, the characters showing far fewer exceptions.

Var. **aurantiacum** (Bicknell) n. comb. *T. aurantiacum* Bicknell, *Torreyia* i. 26 (1901). In somewhat richer and heavier soil than the last: Quebec, New Brunswick, southern Maine, eastern Massachusetts, Connecticut, and New York to the mountains of Virginia, and from Ontario to Illinois and Wisconsin. This variety is variable as to the characters usually used in separating it from the typical form. Occasional specimens have perfoliate leaves, but all other characters normal. It is not unusual to find the type of pubescence characteristic of the variety combined with acute and often narrow sepals as in the typical form of the species, and the reverse combination is almost equally common.

Var. **illinoense** n. var. A var. *aurantiaco* recedit caulibus et calycis segmentis et foliorum pagina superiori longius setosis. Differing from var. *aurantiacum* in the longer hairs on the stem, sepals and upper leaf surface. Ohio and Illinois. OHIO: Columbus, 1837, *Sullivant*. ILLINOIS: Joliet, *H. C. Skeels*, no. 615; Oquawka, *Harry N. Patterson* (TYPE in Gray Herb.); Galva, 1878, *C. H. Ford*; Stevens Creek, *A. Gleason*; Mahomet, *U. E. Davis*. Plants of this variety appear related to *T. angustifolium* in length of hair on the stems, on the upper leaf-surfaces and on the margins of the sepals; but though *T. angustifolium* has been reported from Illinois there is no evidence that this variety is a hybrid of it with *T. perfoliatum* var. *aurantiacum*.

Var. **glaucescens** n. comb. *T. aurantiacum* var. *glaucescens* Wiegand, *RHODORA* xx. 116 (1918). Valley of Cayuga Lake in Central New York where it is as common as var. *aurantiacum*. The writer has seen only one other specimen, and this from Allegheny County, Pennsylvania (*J. A. Shafer*, no. 72). The specimen from Lebanon County, Pa., cited with the original publication of this variety, appears on further study to differ from the Ithaca material. It may be a hybrid of *T. perfoliatum* var. *aurantiacum* and *T. angustifolium*, as the long setae on the sepals and upper leaf-surface would suggest.

T. ANGUSTIFOLIUM L. Sp. Pl. 176 (1753). *T. minus* Michx. Fl. Bor.-Am. i. 107 (1803). Connecticut to Maryland and in the uplands to Alabama and Tennessee; also in Missouri and Illinois. Several perplexing collections have every appearance of being hybrids between this species and *T. perfoliatum* var. *aurantiacum* both structurally and in the local occurrence.

Var. **Eamesii** n. var. Foliis subtus velutinis; corollae laciniis oblongis; sepalis saepius obtusis.—Leaves velvety beneath, slightly broader and less acuminate than in the typical form of the species; lobes of the corolla oblong; sepals more generally obtuse. Stratford (and Milford), Connecticut, 1897, *E. H. Eames*; 1902, *Eames* (TYPE in Gray Herb.); also 1899, *J. R. Churchill*, and 1905, *H. S. Clark*. This has almost the appearance of a distinct species. Dr. Eames says

on his label: "Several colonies of large and small size in rocky copses near coast. The only known N. E. stations [of *T. angustifolium*?] are Milford and Stratford, Connecticut, where I have traced it for several miles in detached colonies." Except for the oblong lobes of the corolla these plants have every appearance of being hybrids of *T. perfoliatum* var. *aurantiacum* and *T. angustifolium*, but true *T. angustifolium* has been reported from Connecticut only from the Windsor region many miles away. A specimen collected by R. C. Bean and M. L. Fernald in Sheffield, Berkshire Co., Massachusetts, resembles the Eames specimens except in the corolla, which, though young, is more like that of *T. perfoliatum* and its varieties.

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CERCIS CANADENSIS IN CONNECTICUT.¹

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ABOUT fifteen years ago one of my students brought into the laboratory a twig of redbud, *Cercis canadensis*, which he had collected "somewhere on West Rock." West Rock is a trap ridge about 400 feet in height, situated on the outskirts of New Haven and site of the famous Judges' Cave. It is included in the New Haven city park system, but for the most part is in a natural condition, being very largely covered with second growth woodland. Since the redbud had not been recorded as a native plant northeast of New Jersey, it was assumed at the time that the specimen in question must have come from a planted tree; but subsequent inquiries from the superintendent of city parks elicited the information that no redbuds had ever been planted in the park, which covers an area of about 200 acres, and until recently the source of the specimen remained a mystery.

One day last May, however, as I was driving along the crest of the Rock, through woods that gleamed white with masses of blossoming dog-wood, my eye was caught by a mass of an entirely different color—the rose-pink of the redbud. The mystery was solved.

There they were, a clump of half a dozen good-sized individuals, ranging from half an inch to nearly two inches in diameter and up to about a dozen feet in height, together with two or three smaller plants.

¹Contribution from the Osborn Botanical Laboratory